excerpts from ASARCO report

151664

shown on Figure 5A are approximations based on historical aerial photo review and professional judgement.

AOC B4-5: Brass plant storage yard

Materials stored in this area included scrap brass, refinery brass, irony brass, irony copper, and brass skims. Zinc and copper slags were also temporarily stored here before transfer to the slag dump. Further investigation is proposed (see Section 5.15).

AOC B4-6: Copper smelting plant storage yard

This area was distinct from the copper storage yard (B4-1) and was located on the north side of the brass scrap plant. Materials stored in this area included copper slag and cobbings (hand-sorted metal), as well as coke. Further investigation is proposed (see Section 5.15).

AOC B4-7: Lead refinery storage yard

This area was located to the west of the lead refinery and was distinct from the lead storage yard (B4-2). In this area clean litharge (lead oxide) from the Cupels, lead bullion, bismuth dross, and other lead drosses were stored. Further investigation is proposed (see Section 5.15).

AOC B4-8: Bismuth plant storage

This area was located on the south side of the lead blast furnaces. Bismuth dross from the lead refinery was stored here prior to further refining. Further investigation is proposed (see Section 5.15).

AOC B4-9: Tin tetrachloride

This area was located on the south side of the lead refinery and may have been contiguous with B4-2. Liquid tin tetrachloride was stored in drums in this area before being shipped off-site. Further investigation is proposed (see Section 5.15).

AOC B4-10: Lead smelter department storage

This area was located to the south and east of the lead blast furnaces. Materials stored here included: lead ore, tin dross, antimony first dross, copper dross, copper matte, high antimony slag, arsenic caustic skims, copper crystals, antimony slag, high antimony crystals, coke, and scrap battery plates. Further investigation is proposed (see Section 5.15).

AOC B4-11: Zinc chioride

This area was located near the northeast corner of the lead refinery. Drums of liquid zinc chioride were received from the ASARCO Omaha plant. They were stored here temporarily prior to further on-site refining. Further investigation is proposed (see Section 5.15).

AOC B4-12: Cupeling and retorting department storage

This area was located on the east side of the lead refinery. Materials stored here included: lead-desilverizing crusts, baghouse dust, clean litharge, "dirty" litharge (high copper lead oxide), sharp slag, and selenium-tellunum soda slag. Further investigation is proposed (see Section 5.15).

AOC B4-13: Parting plant storage

This area was located to the south of the parting plant. Materials stored here included: copper anodes and copper cement. Further investigation is proposed (see Section 5.15).

3.3 Part C: Drainage Systems

With the exoeption of a single septic system (AOC C5), a drywell (AOC C8-1), and a sump (AOO C8-2) all of the AOCs related to site drainage are interconnected. The cooling pond (AOC C3-1) was fed in part by the storm sewer system. Overflow from the pond drained to Arthur Kill via the storm sewer system. Other storm sewers drained to Crane's Creek. The original sanitary sewers in the main production portion of the facility also drained to these surface water bodies. All of the AOCs associated with site drainage systems are illustrated on Figure 6. A discussion of each is presented below.

To satisfy the plant's requirement for large volumes of cooling and fire protection water, a salt water pumping system was installed at an early date. This system pumped saltwater from Arthur Kill to various locations on-site including the cooling pond. As this was a circulating system, saltwater was returned to the Kill through parts of the storm sewer system. The saltwater system was used for slag granulation and for pumping granulated slag to the slag yard on the South Property. The salt water system is also shown on Figure 6.

AOC C-1: Storm sewer collection systems

All known storm sewer collection systems are illustrated on Figure 6. The various storm sewer lines were identified on and plotted from historical site maps which are

referenced on Figure 6. Based on the historical maps, the storm sewer system included approximately 17,500 linear feet of subsurface piping and open ditches, as well as approximately 90 catch basins. The vast majority of the catch basins are no longer visible, having been either removed, filled or obliterated during the plant demolition process. Similarly, large portions of formerly open ditches have been filled in. The feature which formerly served as the cooling water holding pond (AOC C3-1) currently functions as a storm water retention basin. It originally drained to the subsurface storm water drainage system through an outlet at its northeast corner. However, the drains have been blocked and the pond currently drains over land to the timber-cribbed ditch and infiltrates into both the slag fill and natural soil.

A few storm sewer connections were directed through NPDES Outfall 001, into a municipal storm sewer. The municipal storm sewer travels south for a few hundred feet, then discharges to Cranes Creek. Existing and former storm sewers in the main production area discharge or discharged to Crane's Creek or Arthur Kill at five NPDES permitted outfalls (see AOC D1-1 through -5 below). Both surface water and sediment sampling is proposed in Sections 5.6, 5.7 and 5.8.

AOC C-2: Sanitary Sewers

All known sanitary sewers are illustrated on Figure 6. The various sanitary sewer lines were identified on and plotted from historical site maps which are referenced on the Figure. Based on the historical maps, the sanitary sewer system included approximately 10,000 linear feet of subsurface piping.

The sanitary facilities associated with the earliest plant buildings originally discharged to the nearby surface water bodies, Crane's Crook and Arthur Kill, at outfalls which were later permitted as NPDES discharge points. All existing sanitary discharges are directed to the municipal sanitary sewer system (a combined system) beneath State Street either directly or via a lift station located to the south of the alloy plant. Sanitary waste has been directed to the municipal system since at least 1946.[26]

None of the historic site maps reviewed showed either the locations of floor drains and sinks or their configuration with regard to facility sanitary or storm sewer systems. In addition, none of the drawings show septic systems associated with the process buildings and none were found during building demolition. Because the buildings are gone, and in the absence of drawings showing them, it is not possible to determine whether drains or sinks were present, or if so to locate them. It is

[26]. ASARCO Drawing 12205-A, 10/23/1946,General Layout of Sanitary Sewer System.

possibla tbat former drains and sinks were tied into either tbe sanitary or the storm sewer systems. Regardless of which system received the floor drain effluent, the ultimate discharge points would be the same NPDES outfalls, as both systems were at one time tied together. Sediment sampling is proposed for these outfalls (see AOC D1-1 through -5, and Section 5.8 below).

AOC C3: Ponds

AOC C3-1: Cooling pond[27]

The cooling pond is a man-made impoundment located immediately to the west of the copper tank house. The cooling pond first appears on a site drawing dated 1900[28] but is believed to have been present since the construction of the smelter. Based upon its proximity to a former clay pit we suspect it was originally a low lying clay pit-floor at the time the site was purchased by M. Guggenheim in 1894. The shape of the pond has changed considerably over the years (see current and existing shorelines on Figure 2A). The cooling pond originally served two functions: cooling water supply, and fire protection reservoir. As shown on Figure 6, it was connected to the storm sewer system, the sanitary sewer system, the saltwater circulation system and the facility fire protection system. Currently, the cooling pond serves as a storm water retention basin. It has been mapped as State Open Waters on the National Wetlands Inventory Map (see Figure 7 of the April 2006 RIWP). BB&L submitted a Letter of Interpretation (LOI) application for this structure on March 18, 2005. No NJDEP response to the application has been reported to ASARCO.

The Cooling Pond sediment has previously been sampled. Sample SD-2 was collected frpm the pond, which contains fresh water. Therefore, the results of SD-2 were compared to the Freshwater Sediment Screening Guidelines. The concentrations of arsenic (As), cadmium (Cd), copper (Cu), chromium (Cr), lead (Pb), mercury (Hg), nickel (Ni), silver (Ag), and zinc (Zn) all exceeded the specified guidelines. This structure is clearly not desirable as a wetland asset.

On October 20, 2000, a series of sixteen depth measurements were made on transects across the former cooling water pond. These measurements were to be used to determine the degree of communication between the pond and the shallow groundwater. Prior to running the transects, the static water level was measured at a surveyed reference point along the south side of the pond. Measured water depths ranged form 1.8 feet to a maximum of 4 feet. Based on the measured water

27. The majority of this diecussion of the cooling pond is taken from the April 2006 RIWP.

28. ASARCO Drawing No. 1218, 3/9/1900: Section through General Plan - Section B.

levels and water in a nearby well, the pond appears to be in communication with groundwater.

The Cooling Pond provides hydraulic head which significantly influences the speed and direction of contaminated groundwater flow. Complete elimination of this mounding source will provide a great deal of environmental benefit. As part of the remedy for the site, we recommend that the NJDEP Site Remediation Case Management team endorse the complete closure of this structure as a measure to protect the Arthur Kill estuary system. Additional sampling is proposed in Section 5.7.

AOC C3-2: Former converter building slag granulator pond

The slag granulator pond was an irregularly shaped man-made impoundment measuring about 120 feet by 80 feet. It was located near the northeast corner of the former converter (blast furnace) building and was used as a reservoir to supply a distribution pump. It first appears on a drawing of the on-site saltwater system dated 1923[29]. It does not appear on any of the other historical site maps reviewed. Saltwater was used to rapidly cool the hot slag in slag pits, causing it to shatter into granules. Overflow from the granulator pits was directed to the storm sewer system and thence to Crane's Creek. Some of the excess water was also used to transport the granulated slag via pipeline to the slag dump.

It is unclear when the slag granulators were taken out of service. Based on aerial photos, this feature was filled before 1940. Area-specific investigation of this AOC is not proposed. Rather, it will be addressed in the proposed completion of the site-wide fill characterization (see Section 5.15 below).

AOC C4-1 through -7: Existing floor drains

Seven floor drains have been identified in the buildings still present on-site. The locations of each are shown on Figure 6. None of the historic site maps reviewed showed the locations of floor drains in production buildings or their configuration with regard to sewer systems. The existing floor drains are found in buildings on the west end of the site which are known to have direct connections to either the municipal sanitary sewer system or to the storm water system. Furthermore, the existing drains are not located in processing or production areas and are covered or do not receive hazardous discharges. Therefore, these drains do not represent actual potential discharge areas and no further investigation of them is recommended.

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[29]. ASARCO Drawing No. 6073-C, 10/17/1923: Diagram of Salt Water Lines.

The existing floor drains, referenced to the current Bridgeview Management building number system, are as follows:

AOC C4-1: Building 6 (office), first floor men's room, drains to sanitary;
AOC C4-2: Building 6 (office), foot of basement stairs, drains to sanitary;
AOC C4-3: Building 6 (office), west end lavatory, drains to sanitary;
AOC C4-4: Building 4 (engineering), drains to sanitary;
AOC C4-5: Building 10 (magnesium plant), a storm drain grate, now covered;
AOC C4-6: Building 3(original gate house) drain is sealed with concrete; and,
AOC C4-7: Building 12 (research building), 2 connected drains in west end, reported by BB&L, unable to locate.
AOC C4-8: Building 5 (now Randive), tested, found to drain to sanitary system.

The discharge points of these drains were discussed with Miles Overall Maintenance, Inc. (M.O.M.I.), the on-site contractor for routine site maintenance. The results of their investigations are shown above. The only drain found to discharge to other than the municipal sanitary sewer is that in Building 10 (C4-4). The drain is connected to a storm sewer which leaves the site at NPDES-outfall 001 (see **AOC** D1-1) which will be evaluated by sampling (see Section 5.8 below).

AOC C5: Septic system

A single septic system formerly existed on-site[30]. It was located along the waterfront to the south of the former saltwater pump house and serviced the dock office. The system consisted of a concrete settling tank, distribution box, and three laterals. The infiltration field measured 30 feet by 60 feet. The system received only sanitary waste from the dock office lavatory.

The septic system was constructed in 1951, after the rest of facility had been tied to the municipal sanitary sewer system. It is assumed that the septic system remained in operation up until the dock office was abandoned and demolished.

The septic system was located within the area of a proposed No. 6 oil spill remediation (see **AOCs** A1-3 and D5, and the Remedial Action Workplan: No. 6 Oil Recovery, currently under revision by **ASARCO**). Two test pits were excavated in this area during November 2006 in conjunction with the evaluation of the historic No. 6 oil spill. No evidence of the former septic system was observed. The former septic system area will be addressed through the No. 6 oil spill remediation. Therefore, no further investigation of the septic system is proposed.

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[30]. ASARCO Drawings No. 13506-C, 1/4/50: General Arrangement of Piping at Dock Office Toilet; and 13507-C, 1/5/51: Detail of Septic Tank for Dock Office Toilet.